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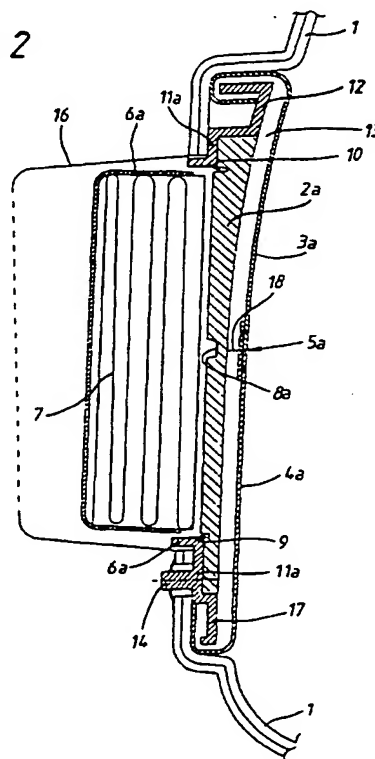
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(54) Interior panel for a door with a side impact airbag having a decorative skin backed by a flexible foam and a foam moulding held in a frame.

(57) The airbag 7 is guided in a funnel 6 which fits in a cut-out 16 in the interior panel 1. The cut-out 16 is closed by a foam moulding 2 provided with predetermined break points 8, and hinge points 9, 10. The cut-out is covered, towards the interior of the car, with a decorative skin 3, 4 and is backed by a flexible foam which is fixed to the interior panel 1. The skin is divided in two with the formation of a seam 5 which rips open when the airbag is activated.

Fig. 2



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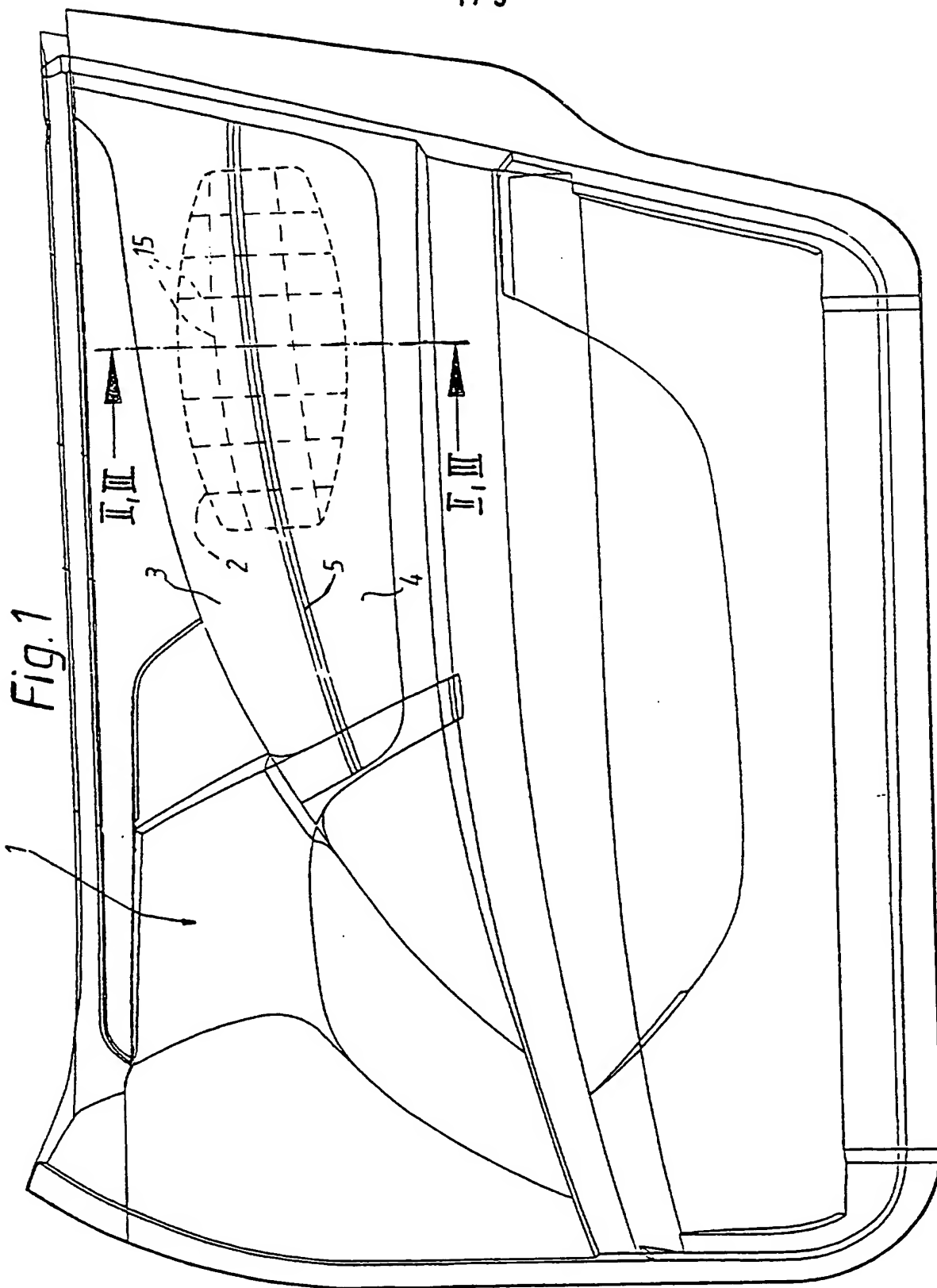


Fig. 2

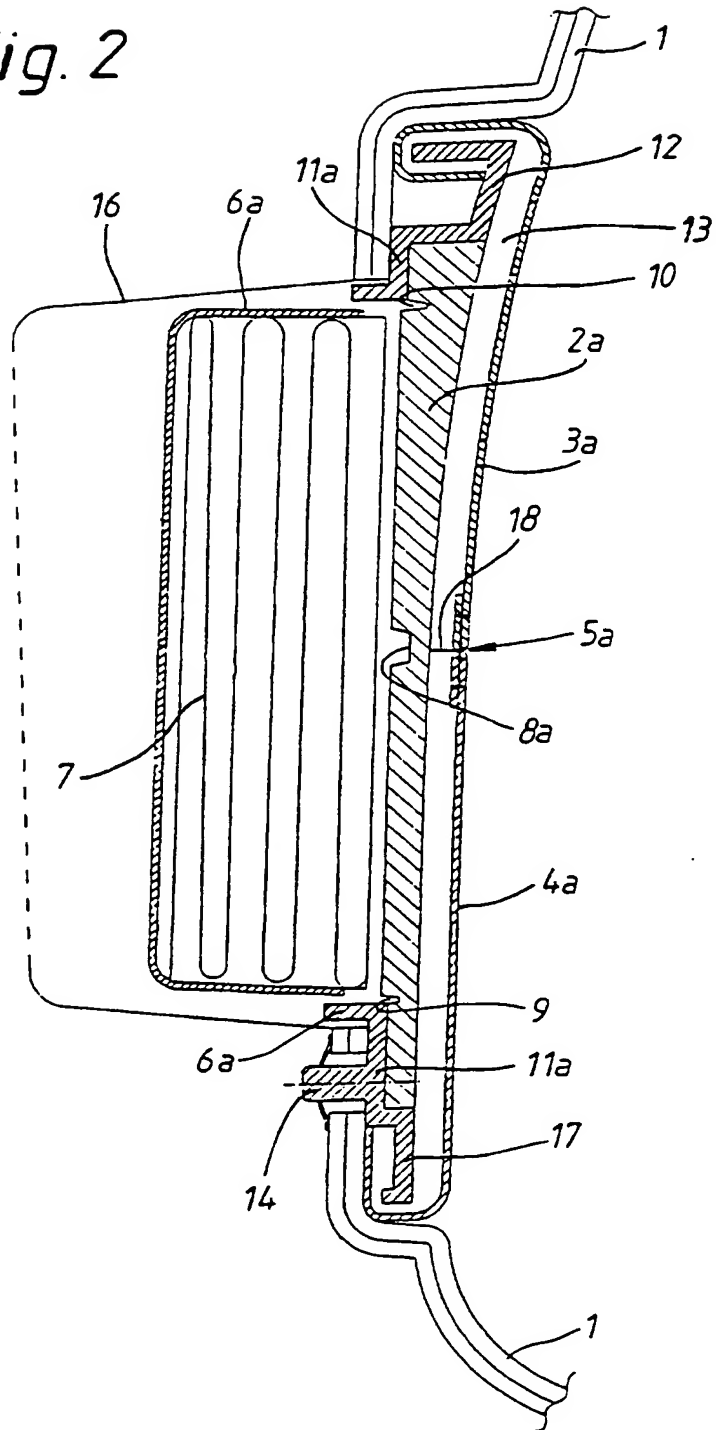
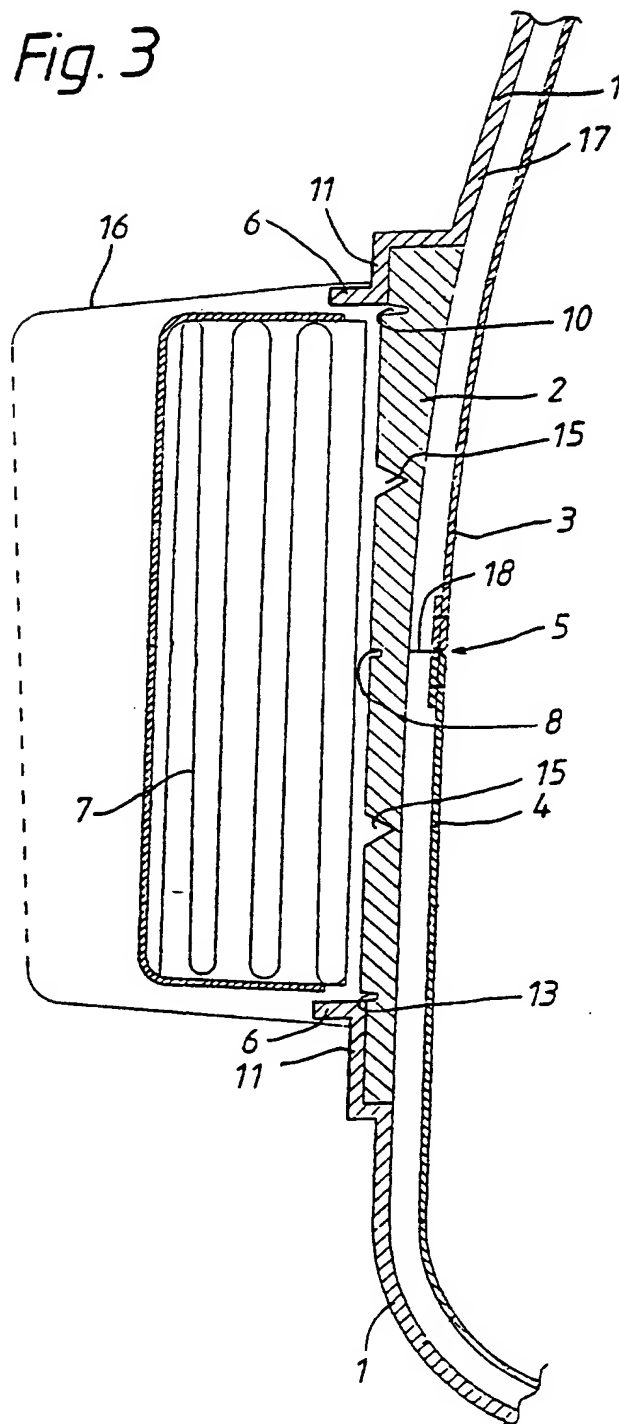


Fig. 3



Interior panelling part for a
side door of a vehicle

The invention relates to an interior panelling part for a side door of a vehicle, particularly but not exclusively a passenger car, which door is provided with side impact protection in the form of an airbag.

DE 90 06 029 U1 discloses an interior panelling part for a motor vehicle which is provided with a decorative cover. The decorative cover has a foam backing for cushioning purposes.

US-A 5 172 790 discloses a passenger car, the side doors of which are each provided with side impact protection in the form of an airbag unit.

The present invention seeks to provide an interior panelling part of the type mentioned at the beginning which, on the one hand, is functionally suitable for an airbag, and, on the other hand, from the interior of the car, however, an aesthetically attractive and stylistic arrangement is ensured, even in the region defining the airbag expansion zone.

According to the present invention there is provided an interior panelling part for a side door of a motor vehicle, which door is provided with side impact protection in the form of an airbag which is arranged in a recess in the interior panelling part, a funnel edge being provided in an exit region of the recess for the forced guidance of the airbag when this is activated, wherein the recess is covered by a stiff foam moulding which is supported in a carrier frame surrounding the recess and is provided with a predetermined break line running across the recess intermediate two opposed sides, and which moulding is covered, towards the interior of the vehicle, by means of a decorative skin connected fixedly to the interior panelling part and is divided in two at the line of the predetermined break line, the two parts of the decorative skin being joined together by means of a seam forming a tear line which

rips open when the airbag is activated.

The provision of the funnel creates a defined exit for the airbag in that the funnel brings about forced guidance. Using a foam moulding to close the cut-out makes it possible for that side of the interior panelling part which protrudes into the interior of the car to be configured three-dimensionally, largely in accordance with stylistic stipulations, in that the foam moulding is correspondingly expanded. The foam moulding is completely concealed by the decorative skin, with the result that the interior panelling part obtains a uniform appearance. The dividing in two of the decorative skin causes the connecting seam to rip when the airbag is activated and ensures the function of the airbag unit as side impact protection. By virtue of the fact that the decorative skin is divided in two approximately half way up the cut-out, the seam is positioned virtually centrally with respect to the airbag lying therebelow. The effect of this measure is to prevent the flapping action, known from the prior art, of a large flap which, for example, opens from the top or bottom, and, as a result, a so-called whipping effect is prevented. The seam is configured in a manner such that it rips open over the entire length, the decorative skin, however, remaining fixedly connected to the interior panelling part.

In a development of the invention, the foam moulding has a plurality of predetermined break lines extending over its surface in a grid-like manner. This results in an increase in the mobility of the foam moulding, and hence also in its flexibility, when the airbag is activated. This measure achieves a further reduction in the occurrence of a whipping effect.

In a further development of the invention, a rear side of the decorative skin, which is directed towards the foam moulding, is backed with flexible foam. This results, on the one hand, in the seam ripping open safely and, on the other hand, in an attractive appearance and feel.

In a further development of the invention, the foam

moulding is connected to the flexible foam with the insertion in between of an intermediate layer, in particular a non-woven, which prevents the foam moulding from being detached from the flexible foam. This results in the foam moulding being connected, over its entire surface, fixedly to the flexible foam and hence to the decorative skin and thus prevents parts of the foam moulding, which could fly around the interior of the vehicle, from being detached. At the same time, the intermediate layer is sufficiently tear-resistant that it acts, in the region of the edges of the cut-out, as a hinge for the two parts of the foam moulding.

In a further development of the invention, the flexible foam and the intermediate layer have a parting line at the height of the predetermined break line of the foam moulding. As a result, when the airbag is activated the opening forces are greatly reduced.

In a further development of the invention, towards the airbag the foam moulding is supported with its edge on a frame connected fixedly to the interior panelling part. This measure is expedient so as to prevent the foam moulding from being unintentionally pushed through into the funnel for receiving the airbag, which could, for example, happen due to the front-passengers or drivers elbow. In order to fix the foam moulding on the interior panelling part, the foam moulding is adhesively bonded to the edge, bonding points only being provided in the region of the hinge axes of the foam moulding so as not to hinder the opening of the two parts of the foam moulding.

In a further design of the invention, the seam extends over the entire width of the decorative skin. This ensures that the cut-out opens completely for the exit of the airbag.

In a further development of the invention, the seam is designed as a double overlapping seam. As a result, the parting line between the two parts of the decorative skin is designed such that it is visually attractive.

In a further development of the invention, an airbag

unit, which contains the airbag, and the interior panelling part are fastened together by means of at least one fastening point on an inside door panel of the side door. This additional fixing to the bodywork wall prevents the interior door panelling or the airbag unit from being detached from the side door and causing injury to the people in the vehicle.

Other advantages and features of the invention emerge from the following description of exemplary embodiments of the invention which are illustrated in the drawings, in which:-

Fig. 1 shows an embodiment of an interior panelling part, according to the invention, for a side door of a passenger car, which door is provided with a cut-out for the exit of a side airbag,

Fig. 2 shows a section through an interior panelling part according to Fig. 1, along the line of intersection II-II in Fig. 1, and

Fig. 3 shows a section through a further interior panelling part according to Fig. 1, along the line of intersection III-III in Fig. 1.

An interior panelling part 1 according to Fig. 1 is provided for a side door of a passenger car, the interior panelling part 1 being fastened to a flange edge of the side door by means of a suspension rail and a plurality of clips. In addition, the interior panelling part 1 is fixed on the side door by means of a grab handle connected to the shell of the side door, by means of a lock rose in the region of the opening and closing mechanism and by means of a plurality of peripheral clip connections. This stable connection of the interior panelling part 1 to the side door prevents the interior panelling part 1 from splitting off when an airbag 7, described in further detail below, is activated. Just above an armrest, which is not described in more detail, the interior panelling part 1 has a recess or cut-out 16 for the exit of the airbag 7 into the interior of the car in the event of a side impact (Fig. 2 and 3). The

edge of the cut-out 16 is provided with a surrounding frame 11, 11a in which a foam moulding 2 is embedded in a flush manner. The cut-out 16 is shown, by means of the broken lines, as the space extending as far as an inside door panel of the side door.

In an exemplary embodiment which is not illustrated, the inside door panel of the side door, the airbag unit and the interior panelling part are fixed to one another by means of one or more fastening points, with the result that the airbag unit or the interior panelling part is prevented from being detached from the side door, even in the event of high loads - such as a side impact with a high degree of deformation of the side door, and reliable activation of the airbag is ensured.

In the case of the exemplary embodiment according to Fig. 2, the frame 11 represents a component which is separate from the interior panelling part 1 and is fixed to the interior panelling part 1 with the aid of fastening elements 14 in the form of clips around the cut-out. The frame 11 is part of a frame carrier 12 which is arranged in a corresponding recess in the interior panelling part 1. The frame 11 forms a support for the foam moulding 2, which closes the cut-out, so as to prevent the foam moulding 2 from being pressed through towards the side airbag 7 from the interior of the car. The foam moulding 2, the frame carrier 12 and a two-part decorative skin 3a, 4a are first joined together to form an integral component and are then inserted in composite form into the recess in the interior panelling part 1 and fastened by means of the fastening elements 14. Different decorative material, in particular fabric, leather or plastic film, is used as the decorative skin 3a, 4a. The decorative skin 3a, 4a is backed with flexible foam 13 made of polyurethane and is adhesively bonded to the foam moulding 2 and the frame carrier 12 in accordance with the embodiment illustrated in Fig. 2. After bonding, the composite formed is connected rigidly to the interior panelling part 1 by means of the fastening elements

14. The side airbag 7 is forcibly guided in such a manner in a funnel 6, representing a funnel edge, of the interior panelling part 1 that it exits from the interior panelling part 1 into the interior of the car in a defined manner at the height of the cut-out. The side airbag 7 is arranged in an airbag housing, which is not described in more detail, the edge of which has an axial overlap with the funnel edge 6, 6a. Provision is made radially for a clearance between the housing edge and the funnel edge, which clearance serves as tolerance to compensate for movements of the interior panelling part in the event of the side door being deformed. The foam moulding 2 is shaped in accordance with the contour of the interior panelling part 1 and thus fits flush into the contour of the interior panelling part 1. The foam moulding 2 is provided with three predetermined break lines 8, 9, 10 running approximately horizontally, one break line running transversely 8 in the centre, approximately half way up the cut-out. The predetermined break line 10 is provided in the region of an upper edge and the predetermined break line 9 is provided in the region of a lower edge of the cut-out. The predetermined break lines 9 and 10 are designed such that the foam moulding 2 rips open along its central predetermined break line 8 and the remaining parts pivot into the interior of the car in a hinge-like manner, on the one hand along the upper predetermined break line 10 and, on the other hand, along the lower predetermined break line 9.

At the height of the central predetermined break line 8, the decorative skin 3a, 4a is divided in two, over its entire width, into an upper decorative part 3a and a lower decorative part 4a. The parting line is closed by means of a seam 5a, in the form of a double overlapping seam, which extends over the entire width of the decorative skin 3a, 4a. Since both the upper decorative part 3a and the lower decorative part 4a are each pressed fixedly against the interior panelling part 1 by means of the frame carrier 12, the two parts remain connected to the interior panelling part 1 even when the side airbag 7 is activated. The seam 5a

is situated at the height of the predetermined break line 8a. The flexible foam 13 is likewise cut along the predetermined break line 8a of the foam moulding 2a, and hence along the seam 5a, by a cutting line 18 in order to reduce the rip-open forces for the side airbag 7. In order to prevent the foam moulding 2a, or parts of the foam moulding 2a, from becoming detached from the flexible foam 13 when the side airbag 7 is activated, an intermediate layer in the form of a tear-resistant non-woven 17 is inserted between the foam moulding 2a and the flexible foam 13, which non-woven is connected to the foam moulding 2a and to the flexible foam. The non-woven 17 is connected to the interior panelling part 1 or to the frame carrier 12. In the region of the upper and the lower edges of the frame 11a the non-woven 17 in each case forms a hinge, the non-woven 17 also, of course, having a parting line at the height of the seam 5a. The foam moulding 2a is adhesively bonded to the frame 11a, bonding points being located in each case only in the region of the hinge axes, i.e. in the region of the upper and lower edges of the frame 11a, in order to reduce the rip-open forces.

In the case of the exemplary embodiment according to Fig. 3, the arrangement of the side airbag 7, and of the funnel 6, the cut-out and the foam moulding 2 which closes the cut-out, correspond to the exemplary embodiment according to Fig. 2 and reference is hence made to Fig. 2 for more detailed explanation of the embodiments. In addition, the foam moulding 2 has a plurality of predetermined break lines 15 which run horizontally and vertically in a grid-like manner and have a triangular cross-section in order to obtain a notch effect. The foam moulding 2 of the interior panelling part 1 according to Fig. 3 is likewise supported by a frame 11 which, however, - in contrast to the exemplary embodiment according to Fig. 2 - is formed around the cut-out integrally with the interior panelling part 1. The foam moulding 2 is fitted flush into the contour of the interior panelling part 1. The

decorative skin 3, 4 of the interior panelling part 1 according to Fig. 3 is likewise backed by means of flexible foam 13 and is adhesively bonded, with the interposition of the non-woven 17, directly on the interior panelling part 1 and, at the height of the cut-out, to the foam moulding 2. The decorative skin 3, 4 is also provided with a parting line 5 which runs centrally and transversely over the cut-out and extends over the entire width of the decorative skin 3, 4. In the same manner, the flexible foam 13 is cut at the height of the parting line 5, i.e. at the height of the predetermined break line 8, by means of the cutting line 18. This separation forms, as already in the case of the exemplary embodiment according to Fig. 2, an upper decorative part 3 and a lower decorative part 4. The two decorative parts 3, 4 abut flush and evenly against one another and are joined together by means of a seam 5. This results in a virtually invisible parting line, the seam 5, when the side airbag 7 is activated, ripping open over its entire length, as a result of which the cut-out is opened for the exit of the side airbag 7 into the interior of the car.

CLAIMS

1. An interior panelling part for a side door of a motor vehicle, which door is provided with side impact protection in the form of an airbag which is arranged in a recess in the interior panelling part, a funnel edge being provided in an exit region of the recess for the forced guidance of the airbag when this is activated, wherein the recess is covered by a stiff foam moulding which is supported in a carrier frame surrounding the recess and is provided with a predetermined break line running across the recess intermediate two opposed sides, and which moulding is covered, towards the interior of the vehicle, by means of a decorative skin connected fixedly to the interior panelling part and is divided in two at the line of the predetermined break line, the two parts of the decorative skin being joined together by means of a seam forming a tear line which rips open when the airbag is activated.

2. An interior panelling part according to Claim 1, wherein the foam moulding has a plurality of predetermined break lines which extend over its surface in a grid-like manner.

3. An interior panelling part according to Claim 1 or 2, wherein a rear side of the decorative skin which is directed towards the foam moulding is backed with flexible foam.

4. An interior panelling part according to Claim 3, wherein the foam moulding is connected to the flexible foam with the insertion in between of an intermediate layer, which prevents the foam moulding from being detached from the flexible foam.

5. An interior panelling part according to Claim 4, wherein the intermediate layer is a non-woven.

6. An interior panelling part according to Claim 4 or 5, wherein the flexible foam and the intermediate layer have a parting line at the height of the predetermined break line of the foam moulding.
7. An interior panelling part according to any one of the preceding claims, wherein the decorative skin is adhesively bonded onto a frame carrier which is connected fixedly to the interior panelling part and in which the foam moulding is embedded.
8. An interior panelling part according to any one of the preceding claims, wherein the decorative skin is fastened directly to the interior panelling part.
9. An interior panelling part according to any one of the preceding claims, wherein towards the airbag the foam moulding is supported with one edge on a frame connected fixedly to the interior panelling part.
10. An interior panelling part according to any one of the preceding claims, wherein the seam extends over the entire width of the decorative skin.
11. An interior panelling part according to Claim 10, wherein the seam comprises a double overlapping seam.
12. An interior panelling part according to any one of the preceding claims, wherein an airbag unit, which contains the airbag, and the interior panelling part are fastened together by means of at least one fastening point on an inside door panel of the side door.
13. An interior panelling part according to Claim 9, wherein the foam moulding is fixed to the frame with the aid of bonding points which are only provided in the region of the upper and lower edges of the frame.

14. An interior panelling part for a side door of a motor vehicle, substantially as described herein with reference to and as illustrated in the accompanying drawings.

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Amendments to the claims have been filed as follows

1. An interior panelling part for a side door of a motor vehicle, which door is provided with side impact protection in the form of an airbag which is arranged in a recess in the interior panelling part, a funnel edge being provided in an exit region of the recess for the forced guidance of the airbag when this is activated, wherein the recess is covered by a stiff foam moulding which is supported in a carrier frame surrounding the recess and is provided with a predetermined break line running across the recess intermediate to two opposed sides, and which moulding is covered, towards the interior of the vehicle, by means of a decorative skin connected fixedly to the interior panelling part and is divided in two at the line of the predetermined break line, the two parts of the decorative skin being joined together by means of a seam forming a tear line which rips open when the airbag is activated.
2. An interior panelling part according to Claim 1, wherein the foam moulding has a plurality of predetermined break lines which extend over its surface in a grid-like manner.
3. An interior panelling part according to Claim 1 or 2, wherein a rear side of the decorative skin which is directed towards the foam moulding is backed with flexible foam.
4. An interior panelling part according to Claim 3, wherein the foam moulding is connected to the flexible foam with the insertion in between of an intermediate layer, which prevents the foam moulding from being detached from the flexible foam.
5. An interior panelling part according to Claim 4, wherein the intermediate layer is a non-woven.



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Patents Act 1977

Combined Search and Examination Report under Sections 17 & 18(3)

Clarity

The expression 'intermediate two opposed sides' of Claim 1, line 10 is not clear.

The meaning of 'a non-woven' of Claim 4 and page 3, line 3, page 7, lines 9, 11, 12, 15 etc is not clear.

The 'non-woven 17' of page 7, line 12 is described as 'connected to the interior panelling part 1 to the frame carrier 12' but item 17 in Fig. 2 appears to be part of the frame 11.

Novelty or inventive step

Examination of novelty or inventive step has been deferred pending the arrival of the priority documents.

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